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CLINICAL COMPARATIVE EVALUATION OF RADICAL RETROPUBIC AND PERINEAL PROSTATECTOMY APPROACHES FOR PROSTATE CANCER

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We compared the outcomes, advantages, and disadvantages of retropubic and perineal approaches to radical prostatectomy for prostate cancer. From 1990 to 2000, 37 patients (average age : 66.6 years) who underwent radical retropubic prostatectomy (RRP) and 30 patients (average age : 70.1 years) who underwent radical perineal prostatectomy (RPP) were identified from the database of our department. Outcome measures included operative duration, estimated blood loss, blood transfusions, positive margins, complications, and incontinence rates. There were no differences between the RRP and RPP groups in complications, incontinence rates, or positive margins. The mean operative duration was 228 min in the RRP group and 198 min in the RPP group ($p < 0.05$). The mean estimated blood loss was 1,060 ml in the RRP group and 717 ml in the RPP group ($p < 0.01$). The mean volume of blood transfusions was 620 ml in 17 patients in the RRP group and 700 ml in one patient in the RPP group ($p < 0.001$).

In conclusion, the clinical results of RRP and RPP groups were similar ; the advantages of the perineal approach were shorter operative duration, smaller estimated blood loss and less blood transfusion.

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Key words : Prostate cancer, Radical prostatectomy, Perineal approach, Retropubic approach

INTRODUCTION

Radical prostatectomy for prostatic cancer can be roughly classified into the two approaches, retropubic and perineal approaches. Radical perineal prostatectomy (RPP) was developed by Hugh Hampton Young in 1905 and has been considered as one of the radical treatments for prostate cancer since the development¹⁾. On the other hand, nerve sparing radical retropubic prostatectomy (RRP) in which sexual potency can be maintained, was developed by Walsh and Donker²⁾ in 1982 and has been widely used as the golden standard of radical surgery for prostate cancer.

RPP has not become common, because the surgical area is small and the pelvic lymph node cannot be dissected, resulting in low curability. Recent progress in various diagnostic imaging techniques in combination with prostatic-specific antigen (PSA) levels and the Gleason score has enabled us to determine prostate cancer with or without lymph node metastasis^{3–5)}. With increased cases of localized prostate cancer not requiring lymphadenectomy, RPP, a low-invasive surgical procedure, has been reconsidered.

We have been performing RRP for prostate cancer and recently have introduced RPP for localized prostate cancer. In this study, we assessed and compared the clinical results of these two surgical

approaches.

SUBJECTS AND METHODS

Either RRP or RPP was performed on 67 patients who were histopathologically diagnosed with prostate cancer via prostatic biopsy or transurethral enucleation of the prostate (TUE)⁶⁾ from 1990 to 2000 in the Department of Urology, Tama-Nagayama Hospital, Nippon Medical School. RRP was performed on 37 patients whose age ranged from 54 to 79 years, with a mean \pm SD of 66.6 ± 6.1 years. RPP was performed on 30 patients whose age ranged from 55 to 80 years, with a mean \pm SD of 70.1 ± 6.3 years (Table 1). Preoperative serum PSA values were from 3.1 to 84 (average 16.2 ng/ml) in RRP and from 3.2 to 32 (average 9.2 ng/ml) in RPP.

RRP was performed according to the method of Walsh et al.^{7,8)} RPP was performed in compliance with the original procedure reported by Walther et al.⁹⁾ in principle, but with partial modification made by others^{10–12)} RPP with lymphadenectomy was performed from 1990 to 2000 and recently this method has been used only in cases with suspected lymph node metastasis. Orchiectomy was done on 9 of the 37 patients. On the other hand RPP has been done in cases of localized carcinoma as low-invasive surgery without pelvic lymph node dissection since 1994. When possible, surgery was performed with unilateral or bilateral nerve sparing. In RPP, when

the vesical neck could not be fully identified (this problem often occurs especially after transurethral resection of the prostate [TUR-P]), we confirmed the vesical neck, trigone, and the ureteral opening with a resectoscope for TUR and then made a totally annular incision using a knife electrode at the site to be resected in the vesical neck to render help to the resection¹¹⁾. Antiandrogen therapy was given in recurrence cases as adjuvant therapy.

Clinical staging and postoperative histopathological classification were based on the third edition of General Rule for Clinical and Pathological Studies on Prostatic Cancer¹³⁾ and TNM-classification by UICC¹⁴⁾, respectively. Significance testing between the groups was performed with the t-test.

RESULTS

1. Clinical staging and histopathological assessment (Table 1)

The clinical stages and histological differentiation of 76 patients are shown in Table 1.

Among the 31 patients with margin positive in the

RRP group, capsular invasion was observed in 7 patients (22.6%), seminal vesicle invasion in 9 (29.0%), stump on the bladder side in 4 (12.9%), stump on the urethral side in 6 (19.4%), and lymph node metastasis in 5 (16.1%). Among the 28 patients with margin positive in the RPP group, capsular invasion was seen in 5 (17.9%), seminal vesicle invasion in 6 (21.4%), stump on the bladder side in 8 (28.6%), and stump on the urethral side in 7 (25.0%).

2. Surgical results

The operative duration was 150 to 385 min with a mean \pm SD of 228 ± 53 for the 37 RRP patients, and 127 to 300 min with a mean \pm SD of 198 ± 42 for the 30 RPP patients. The mean operative duration was significantly shorter in the RPP group than in the RRP group ($p=0.0456$).

The perioperative blood loss was estimated to be 450 to 2,120 ml with a mean \pm SD of $1,060 \pm 485$ in the 37 RRP cases, and 110 to 1,400 ml with a mean \pm SD of 717 ± 421 in the 30 RPP cases. The perioperative blood loss was significantly smaller in the RPP group than in the RRP group ($p=0.0097$).

Table 1. Comparison of disposition of patients between RRP and RPP group

Variable	RRP (n=37)	RPP (n=30)
Age (yrs., Mean \pm SD)	66.6 \pm 6.1	70.1 \pm 6.3
Clinical stage (No., %)		
A1	4 (10.8)	2 (6.7)
A2	12 (32.4)	4 (13.3)
B1	11 (29.8)	9 (30.0)
B2	5 (13.5)	9 (30.0)
C	4 (10.8)	0 (0.0)
Unknown	1 (2.7)	6 (20.0)
Histological grade (No., %)		
Well diff.	4/34 (11.8)	0/29 (0.0)
Moderately diff.	8/34 (23.5)	8/29 (27.6)
Poorly diff.	16/34 (47.1)	13/29 (44.8)
No-cancer after TUE	6/34 (17.6)	8/29 (27.6)
Unknown	3	1
Margin positive (No., %)		
Prostatic capsule	7/31 (22.6)	5/28 (17.9)
Seminal vesical	9/31 (29.0)	6/28 (21.4)
Bladder neck	4/31 (12.9)	8/28 (28.6)
Prostatic apex	6/31 (19.4)	7/28 (25.0)
Regional lymph nodes	5/31 (16.1)	
Surgical results		
Operative duration (min, Mean \pm SD)	228 \pm 53	198 \pm 42*
Blood loss (ml, Mean \pm SD)	1,060 \pm 485	717 \pm 421**
Blood transfusion (No., %)	17 (46.0)	1 (3.3)
Complications (No., %)		
Urethral stricture	3 (8.1)	1 (3.3)
Rectal injury	1 (2.7)	0 (0.0)
Perineal abscess	0 (0.0)	1 (3.3)
PSA recurrence (No., %)	9 (24.3)	3 (10.0)

* $p=0.0456$; ** $p=0.0097$.

Table 2. Comparison of RRP and RPP in incidences of post-operative incontinence

	Months after surgery	Incontinence			Continence
		Grade 3	Grade 2	Grade 1	
RRP (n=37)	3	3	4	6	24 (64.9%)
	6	2	1	5	29 (78.4%)
	12	2	0	3	32 (86.5%)
RPP (n=30)	3	3	3	3	21 (70.0%)
	6	0	2	3	25 (80.7%)
	12	0	0	2	28 (93.3%)

Blood transfusion was performed on 13 of the 37 RRP patients, the amount was 400 to 2,632 ml with a mean \pm SD of 620 ± 715 . Among the 30 RPP patients, blood transfusion was performed in one patient alone; the amount was 700 ml.

3. Postoperative complications

There were few postoperative complications in the 67 patients (Table 1). With respect to postoperative incontinence, the continence rate 3 months after surgery was 64.9% and 70.0% in the RRP and RPP groups, respectively. The continence rate 1 year after surgery improved to 86.5% and 93.3%, respectively (Table 2).

4. Biological recurrence rate

For the 37 RRP patients, the postoperative follow-up period until December 2001 ranged from 3 months to 10 years and 4 months, with a mean follow-up period of 6 years and 7 months. In the 30 RPP patients, the follow-up period ranged from 10 months to 6 years, with a mean follow-up period of 3 years and 5 months. The recurrence judged by PSA level was observed in 9 RRP patients (24.3%), and the time until the recurrence ranged from 9 months to 3 years following the surgery with the mean time until the recurrence of 3 years and 4 months. Recurrence was observed in 3 RPP patients (10.0%), and the time until recurrence ranged from 11 months to 2 years following surgery with a mean time until recurrence of 1 year and 5 months (Table 1).

DISCUSSION

Recently, radical prostatectomy has been widely introduced for prostate cancer in Japan. As a result of improving diagnostic ability owing to PSA measurement, trans-rectal ultrasonography (TRUS), computed tomography, and magnetic resonance imaging as well as the popularization of prostate cancer screening and ultrasound guided prostate biopsy, the cases of localized prostate cancer has been increasing in number.

There are many reports showing the effectiveness of radical prostatectomy for prostate cancer¹⁵⁾ Major surgical techniques include perineal, retropubic, and laparoscopic approaches. We have performed retropubic and perineal procedures, in the latter of

which we often had difficulty in identifying the borderline between the vesical neck and prostate especially after TUR-P. In such a case, as mentioned above, we made an annular incision at the site to be resected in the vesical neck using a knife electrode under resectoscopic guidance as the mark of an appropriate site of resection. This procedure has major advantages, such as no need to reconfirm the ureteral opening after the resection in vesical neck¹¹⁾

The mean operative duration and perioperative blood loss for our 37 RRP patients, were 228 min and 1,060 ml, respectively. As compared with the mean operative duration and blood loss in RRP of 126 min and 1,138 ml, respectively reported by Sullivan et al.³⁾, our operative duration was longer, whereas few differences were found in blood loss. The mean operative duration and perioperative blood loss for our 30 RPP patients were 198 min and 717 ml, respectively. Gibbons et al.¹⁶⁾ reported the mean operative duration and blood loss in RPP to be 180 min and 880 ml, respectively, and Elder et al.¹⁷⁾ also reported them to be 205 min and 851 ml, respectively. Our results were similar to the above results. Similar to the report by Sullivan et al.³⁾, the mean operative duration was shorter in RPP than in RRP, and the mean perioperative blood loss was smaller in RPP than in RRP. Blood transfusion was performed in 1 RPP patient (3.3%) compared with 17 RRP patients (46.0%). These results suggested that RPP had advantages statistically over RRP in operative duration, blood loss, and blood transfusion.

With respect to the incidence of rectal injury, a perioperative complication, Lance et al.²⁰⁾ reported it to be 4.9% in RPP, and Todd et al.²¹⁾ reported it to be 1.3% in RRP. In our patients, the incidence of rectal injury was lower in RPP (0.0%) than in RRP (2.7%). These data suggest that due care during surgery could prevent rectal injury even in RPP.

Major postoperative complications include urethral anastomotic stricture, rectal injury, incontinence, and impotence. The incidence of urethral anastomotic stricture was reported to be 0.6% to 6.8% in RRP^{18,19)} and 13% to 18% in RPP^{15,17)} Among our patients, urethral anastomotic stricture developed in 3 RRP patients and 1 RPP patient; the incidence was lower

in RPP (3.3%) than in RRP (8.1%). The continence rate was reported to be 97% after RRP by Catalona et al.¹⁸⁾ In our patients, the continence rate 1 year after surgery was 86.5% in RRP and 93.3% in RPP, without any statistical differences. In this study, postoperative impotence was not evaluated.

Lance et al.²⁰⁾ reported the incidence of postoperative impotence to be 91.1% in RRP, similar to 91.8% in RPP. With regard to nerve sparing RPP, however, Weldon et al.²²⁾ and Frazier et al.²³⁾ reported that potency was maintained in 70% to 77% of the patients undergoing nerve sparing prostatectomy. These figures are similar to the value for RRP (68%) reported by Walsh et al.²⁾ These findings indicate that there are no differences in maintenance of potency following nerve sparing prostatectomy between RRP and RPP.

Since RPP is performed in a narrow field of view, it has the following demerits: a dedicated retractor is desirable; RPP is difficult unless the surgeon knows the anatomy of perineum fully; few directors exist; pelvic lymphadenectomy cannot be performed simultaneously; and it is difficult to identify the vesical neck. However, RPP requires no treatment of dorsal vein complex during procedure, and injury to the venous plexus is avoidable, resulting in a small blood loss and little need for blood transfusion. Furthermore, this perineal approach has the following merits: the operative duration is short; open vesicourethral anastomosis is possible; the patient can rise early postoperatively because of the weak anesthesia; and postoperative pain is mild. The perineal approach, as shown above, is less invasive and can be said to be a superior surgical technique.

The worst weakness of RPP is that pelvic lymphadenectomy is impossible. Levy and Resnick²⁴⁾ reported that RPP following laparoscopic pelvic lymphadenectomy could cover the weakness of RPP. A recent report combining nationwide data in the United States using nomograms by Partin et al.²⁵⁾ revealed that no lymph node involvement was observed in approximately 90% of patients who had undergone radical prostatectomy. Sullivan et al.³⁾ reported that the rate of lymph node metastasis after RRP was 0% in patients with PSA \leq 10 ng/ml and Gleason score \leq 7, and Narayan et al.⁴⁾ also reported that the rate was 1% in patients with PSA \leq 10 ng/ml and Gleason score \leq 6. Iselin et al.⁵⁾ demonstrated that the incidence of postoperative lymph node metastasis was low in patients with PSA \leq 20 ng/ml and Gleason score \leq 7. RPP without lymphadenectomy may be considered in patients with PSA \leq 10 ng/ml and Gleason score \leq 7 after proper staging preoperatively based on diagnostic imaging, PSA levels, and Gleason score for low-invasive surgery.

TUE is a method developed by Hiraoka⁶⁾ to eliminate a defect of TUR-P, incomplete resection of prostatic adenoma. In the procedure of this modified method of TUR-P, a part of adenoma is detached from the surgical capsule using a Hiraoka's prostatic detaching blade instead of the loop of a resectoscope, and then the partly detached adenoma is totally resected by the loop. In cases with prostate cancer originating from and localized in the inner prostate gland, tumor cells might be absent in the peripheral zone of resected specimens. In the present study, no residual prostate cancer was observed in 6 (17.1%) of the 35 RRP patients and 8 (27.6%) of the 29 RPP patients. Judging from these findings, we recommend watchful waiting not total extirpation as the first choice treatment for patients with stage pT1a cancer originating from and limited within the inner gland.

CONCLUSIONS

1) In the 11 years from 1990 through 2000, we performed RRP or RPP on 67 patients in the Department of Urology, Tama-Nagayama Hospital, Nippon Medical School. The clinical results of 37 patients in the RRP group and 30 patients in the RPP group were compared.

2) RPP produced more favorable results for the operative duration, blood loss, and transfusions than RRP. There were no differences between the two approaches in the incidence of postoperative complications including urethral anastomotic stricture and rectal injury or in urinary continence rates.

3) Based on the above, we consider RPP to be a useful surgical procedure for localized prostate cancer.

We published the summary of this paper in the 90th plenary session of the Japanese Urological Association held on April 18, 2002 in Tokyo.

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(迅速掲載)

和文抄録

前立腺癌に対する恥骨後式と会陰式前立腺全摘除術の臨床的比較検討

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1990年から2000年までの11年間に日本医科大学附属多摩永山病院泌尿器科にて恥骨後式および会陰式前立腺全摘除術を67例に施行してきた。その恥骨後式の37例と会陰式の30例についての成績を比較検討した。恥骨後式の平均手術時間は3時間48分，術中平均出血量は1,060 ml，輸血例は17例の平均輸血量は620 mlに対して，会陰式の平均手術時間は3時間18分，術中平均出血量は717 ml，輸血例は1例のみ輸血量は

700 mlであり，いずれも恥骨後式より会陰式のほうが良好な成績を得られた。術中・術後合併症の直腸損傷，吻合部尿道狭窄および尿禁制率については双方に差はみられなかった。

会陰式前立腺全摘除術は限局性前立腺癌に対して有用な手術法の1つと考えられた。

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